Thesis/
Reports
Cruse,
J. C.

THE MOUNTAIN GOAT IN BLACK HILLS NATIONAL FOREST

James C. Cruse

W
MANAGEMENT
General

THE MOUNTAIN GOAT IN BLACK HILLS NATIONAL FOREST

Compiled by

James C. Cruse

April 30, 1959

LIBRARY COPY
ROCKY MT. FOREST & RANGE
EXPERIMENT STATION

TABLE OF CONTENTS

	Page No.
HISTORY OF THE HERD	
Introduction	1
PRESENT STATUS	
Range	1
Census	1
Age and Sex Ratios . . .	1
Productivity	1
FIELD CHARACTERISTICS AND IDENTIFICATION	
The Young	1
The Yearling	2
The Adult	2
Peltage	2
LIFE HISTORY	
Breeding Habits . . .	2
Birth and Rearing of the Young . .	2
Senses	2
Food Habits	2
Use of Salt	4
Water Requirements . . .	4
Competition between Goats and Deer .	4
Movement and Migration . . .	4
Disease and Parasites . . .	5
Decimating Factors . . .	5
MANAGEMENT	
Population to be Maintained . .	5
Removal of Annual Increase . .	5
Reduction of Associating Deer . .	5
BIBLIOGRAPHY	
The majority of this material was abstracted for work by Walter O. Hansen.	

HISTORY OF THE HERD

Introduction The mountain goat was introduced to the Black Hills in 1924 by transplanted goats from Alberta, Canada. They are believed to be Oreamnos americanus missoulae (Allen). Six goats were delivered to Custer State Park in February 1924. Two animals, an adult female and a yearling male, escaped the first night. The rest of the mountain goats escaped in 1929 when a tree fell across the fence of the pen.

PRESENT STATUS

Range The local gross range of mountain goats is contained within the following boundaries (See map). It contains approximately 50 sections or 32,000 acres. About 12 sections or 7680 acres of this is intensively used range. The remaining 24,320 acres is less desirable range.

Mountain goat range expansion seems to be limited by temperature. This conclusion is based on: (a) The limited movement of the animals to higher elevations in the spring; (b) The habit of bedding on high, exposed rock surfaces where air circulation is unobstructed; (c) The habit of loitering in shallow caves or overhanging ledges.

Census Broken terrain and timber prohibit accurate airplane census methods. The most practical method was to estimate the number of animals per square mile and multiply that figure by the number of square miles of range. Approximately 12 goats per square mile are found on optimum range; 4 goats per square mile are found on less desirable ranges. Total populations for the Black Hills is about 300 animals.

Age and Sex Ratios Age classes and sex ratios were studied from July 1948 to February 1949. Of the animals tallied there there were 138 adults, 36 yearlings, and 59 young. The sex ratio is about 1 male per 1 female.

Productivity The age ratio given above indicates that 25% of the goat population is in the young age class, 15% in the yearling age group, and 59% in the adult age group. The annual increment (25 + 75) is 34%. Since the rate of increase involves both the annual increment and older age classes, it will be 1 plus 34% or 1.34%. There are .68 young per older age female if the sex ratio is even. By observation it was found that 12% of the females were barren or had lost their young.

FIELD CHARACTERISTICS AND IDENTIFICATION

The Young The newborn goat is lamb-like in appearance, with large, dark eyes and drooping tail. Young weigh about 7 lbs. and stand 13 inches high at the shoulder. (New York Zoo) Nearly all young have a feral line of dark ash-brown color. This line disappears from the front portion at the beginning of the first winter, but persists over the rear portion until the following spring.

The Yearling The yearling goat can be recognized in the field by the length of his horns. In early summer when the new offspring make their appearance the horns of the yearling are about 4½ inches longer roughly a little shorter than the ears. By mid-summer they are about the same length as the ears or approximately 2/3 the length of the adult horns. Growth continues at a relatively uniform rate and at the end of two full years the horns are just slightly shorter than those of an older animal. A two year old goat is difficult to identify unless an older animal is nearby for comparison. Horn size and length are best for identifying characteristics.

The Adult Sex can readily be determined when the horns are viewed from the front at close ranges. The horn base is much thicker on the males and there is a noticeably greater taper from base to tip. On females the base is narrower and the lateral sides of the horns appear to be parallel. The horns are glossy black on the distal third and a dull, powdery black on the proximal 2/3 of the total length.

Peltage Shedding or molting go on from the middle of April to the first part of July. The animals look pretty ragged in the latter stages of molt.

LIFE HISTORY

Breeding Habits Rutting season begins in the middle of October and ends around the first part of December. Young do not mate until their second year. The mountain goat is polygamous but no harems were observed. This would indicate one male could service two or three females.

Birth and Rearing of the Young The young are born after a 180 day gestation period. Birth places are usually in rock piles intermingled with dense timber. The female and young remain in seclusion for several weeks. After that time the young goat accompanies the mother everywhere. The goats are not sociable, even with other family groups.

Senses Mountain goats depend mainly on keen sight and scent to detect enemies. Sight is the keenest sense.

Food Habits Table I summarizes food habits by seasons based on availability and selection by the animal. Determinations were made by direct, close range observation of the feeding animals and a limited amount of snow-trailing, consequently personal judgement may have influenced the final ratings. Specimens were not available for stomach content analysis. The mountain goat seems content to fill up on the forage at hand rather than search out the most palatable morsels. It does exhibit preferences but will not hesitate to take in a wide variety of species as it grazes along.

The importance of the tree lichen is striking, both from the standpoint of preference and the quantity eaten. This lichen, commonly called Old Man's Beard or tree moss, is very abundant on most trees. Except in winter the goats were seldom seen eating the lichens directly from standing trees, but they were observed spending a great deal of time muzzling the lichens from windfalls and the numerous dead twigs and branches lying on the forest floor. A careful examination of the forest floor discloses the presence of numerous tiny clumps of lichen apparently blown from standing trees.

The use of rock lichens appears insignificant.

From the standpoint of abundance, bearberry must rank high in importance although its palatability is undoubtedly very low. Prior to the first major snowfall of the season no use of bearberry by goats was noted; later, however, it was readily pawed out of the snow and eaten. Throughout the winter this plant constitued a staple food item in the daily diet.

Although not particularly abundant, chokecherry is widely distributed and mountain goats show a decided preference for both leaves and terminal branches. This species is one of the first to show abuse from overbrowsing and already some of these shrubs are dying.

Various grasses contribute considerable toward the goat's diet, particularly in spring when new growth first appears. Throughout the summer and fall, grasses are cropped sparingly, however they are frequently pawed free of snow and closely grazed during the winter.

Brachen fern and various weeds are eaten in large quantities during the summer and fall seasons.

Use of Salt Salt has been placed on Harney Peak for the goats during the past several years, and during the summer months, the animals can be seen licking salt at nearly any time of the day. There is no evidence that goats travel long distances to salt. It is believed that the animals living in the vicinity of the salt ground develops a great fondness for the salt and make frequent visits to it. The most intensive use is in the early summer which may be tied in with the succulence of the food, high temperatures before shedding, and lactation.

Water Requirements Water is not problem on the mountain goat range in the Black Hills except in long periods of drought. Nearly every major canyon gives rise to a small stream, permanent or intermittent and the maximum distance from any point probably would not exceed a half mile. Furthermore, the extensive bare rock surfaces are pitted with numerous small catchment basins which fill with water during rainy weather and hold water several days afterward. Only during periods of drought do all of these water holes on the rocks dry up completely.

The actual need for water cannot be ascertained. It is true that goats using salt invariably look for water after the salt hunger is

Table I. Food Plants of mountain goats in probable order of importance.

Season	Common Name
Fall	Lichen
	Chokecherry
	Grasses
	Bearberry
	Currant
	Serviceberry
	Paper Birch
Winter	Bearberry
	Lichen
	Chokecherry
	Grasses
	Paper Birch
	Currant
	Serviceberry
Spring	Green Grasses
	Chokecherry
	Lichen
	Weeds
	Birchleaf Spiraea
Summer	Chokecherry
	Russet Buffaloberry
	Currant
	Grasses
	Birchleaf Spiraea
	Lichen
	Brachen Fern
	Yarrow
	Rose
	Weeds
Others	Ponderosa Pine
	White Spruce
	Juniper
	Aspen
	Hazel
	Willow

satisfied and occasionally they will interrupt their salt licking to drink water from a near-by pool. Away from the salt ground, use of water has not been observed except as indicated by tracks in the mud bordering streams or seeps.

Competition Between Goats and Deer Mule deer are abundant throughout most of the goat range and competition for food acute between the two animals, Probably less than five percent of the goat range is used exclusively by goats. This deerless area is situated among the highest rocks.

Competition for the food plants themselves is more difficult to evaluate. It has been noted by direct observation that, with few exceptions, goats and deer feed on the same plants. Ground juniper is browsed heavily by deer in winter but is rarely touched by goats.

On the other hand, goats show a fondness for brachen fern and paper birch which are considered unpalatable to deer. Bearberry and tree lichen are staple winter foods of both animals, but because of the abundance of these plants, the competition for these foods is probably insignificant.

Movement and Migration Daily movements generally do not exceed more than one-fourth mile unless disturbed. This movement consists of alternate periods of feeding and resting.

Seasonal movement is limited. Mature goats establish a home territory and remain within its limits year around. What migration there is by elevation, from high ground to bottoms in the winter and back to the high country in the summer, is not well understood.

Diseases and Parasites Little is known on this subject.

Decimating Factors Little is known on this subject.

MANAGEMENT

Population to be Maintained It is impossible to determine the optimum number of mountain goats to be maintained in the Black Hills from the data at hand. With the range showing over-utilization at the present time and with no more suitable sites for range expansion it is doubtful if the herd can be built up much higher without serious consequences. If the percentage of young continue to be high during the next two years, it is believed essential that a limited hunt be initiated not later than the year 1961 in which at least 25 permits be issued on an experimental basis. The ultimate management of mountain goats in the Black Hills can be developed only through the process of trial and error. The present trial indicates an error on the side of overstocking.

Removal of Animal Increase The approximate net annual increase can be harvested by special permit once the optimum size of the herd has been reached. Hunting restrictions should prohibit the taking of kids and prohibit the taking of adult females accompanied by their young. This would leave yearlings, dry females, and adult males subject to hunting. All goats taken under permit should be weighed and measured to provide a record for future references.

Reduction of Associating Deer In order to maintain the maximum number of goats commensurate with available range, it is essential that the associating mule deer be subjected to hunting during the regular deer season to reduce competition for food. The present game sanctuary north of Custer State Park should be discontinued to permit hunting of deer within the goat range.

BIBLIOGRAPHY

Cooney, Robert F. 1942 Trapping and Transplanting Mountain Goats. Proc. of 22nd Annual Conf. of Western Association of State Fish and Game Commissioners, Jackson, Wyoming.

Covey, Raye M. 1948 Mountain Goat Management in Montana. Proc. of the 28th Annual Conf. of Western Association of State Fish and Game Commissioners, Jackson, Wyoming.

Godden, F.W. & Gutzman, L.T. 1938 Bighorn Sheep and Mountain Goats U. Idaho (Moscow) Bull. 33(22). P 43-49; 1 table.

Hanbre, Vernon 1947 Mountain Goats on their Winter Range in the Rattlesnake drainage of Western Montana. Forestry Department library, I. Idaho. 7 pages; 4 pages.

Harmon, Wendell H. 1944 Notes on Mountain Goats in the Black Hills. Jour. Mammalogy 25(2); pp 149-151.

Swift, Lloyd W. 1940 Rocky Mountain Goats in the Black Hills. South Dakota Conservation Digest, Department of Game, Fish and Parks, Pierre, South Dakota. June 1940 pp 8-9; 1 figure

Washington State Game Dept. 1940 Mountain Goat Study: Progress Report. Biological Bull. No. 2, Seattle, Washington. 21 pages illustrated.